

WHAT IS CLAIMED IS

1. A liquid crystal display device comprising:

a control unit for receiving a RGB picture signal and a first timing signal from the
5 external and outputting the RGB picture signal, a second timing signal for displaying the RGB
picture signal on a screen, a backlight control signal, and a bias signal;

a first direct current power conversion unit responsive to an ON state of the backlight
control signal for applying a backlight driving voltage;

a backlight unit for outputting light according to the application of the backlight driving
10 voltage;

a gate driver for outputting a scan signal;

a source driver for a picture signal; and

an LCD panel including a plurality of gate line for transmitting the scan signal, a plurality
of source line intersecting the plurality of gate lines for transmitting the image signal, a plurality
15 of switching element connected to the plurality of gate line and source line, respectively, and a
plurality of picture electrode connected to the plurality of switching element for responding
operation of the plurality of switching element, arranged in a matrix type, wherein fast transition
into a bend state is induced by an application of the bias voltage at initial operation.

2. The liquid crystal display device of claim 1, wherein the control unit comprises

20 a timing controller for outputting a first switching signal the backlight control signal of
OFF state at initial operation and outputting a second switching signal and the backlight control
signal of ON state after a predetermined period elapses;

a second direct current power conversion unit for outputting a predetermined bias
voltage; and

25 a switching unit for outputting the bias voltage as the bias signal when the first switching
signal is applied by the timing controller and the common electrode voltage as bias signal when

the second switching signal is applied by the timing controller.

3. The liquid crystal display device of claim 2, wherein the timing controller applies the backlight control signal of OFF state to the second direct current power conversion unit at the initial operation, and applies backlight control signal of ON state to the first direct current power conversion unit at the point that transition into bend state of liquid crystal arranged in the LCD panel is completed when a predetermined period elapses.

4. The liquid crystal display device of claim 2, wherein the bias voltage is a voltage of less level than the common electrode voltage.

5. The liquid crystal display device of claim 3, wherein the bias voltage is one of -10 volt and -20 volt.

6. The liquid crystal display device of claim 2, wherein the timing controller outputs an alternatively selected one of the first switching signal and the second switching signal when the backlight control signal of OFF state is applied.

7. The liquid crystal display device of claim 1, wherein the control unit comprises a switching unit for performing a first switching of at least one of a gate voltage for the scan signal, a data voltage for the picture signal, and a driving voltage for the backlight and performing a second switching of at least one of a bias voltage and a common electrode voltage for outputting the bias voltage; and

a timing controller for outputting a first switching signal to control the first switching to the switching unit and outputting a second switching signal to control the second switching to the switching unit so that fast transition into bend state of the liquid crystal arranged in the LCD panel is accomplished.

8. The liquid crystal display device of claim 7 further comprises a second direct current power conversion unit for outputting the bias voltage to the switching unit.

9. The liquid crystal display device of claim 8, wherein the switching unit comprises
a first switching unit for ON/OFF switching the gate voltage, the data voltage, and the
backlight driving voltage according to the first switching signal; and
a second switching unit for ON/OFF switching the bias voltage and the common
5 electrode voltage according to the second switching signal.

10. The liquid crystal display device of claim 9, wherein the timing controller,
controls output of the gate voltage, the data voltage, the bias voltage, and the common
electrode voltage at initial operation,
when a first period elapses, interrupts output of the gate voltage, the data voltage, and the
common electrode voltage and controls a selection of the bias voltage,
10 when a second period elapses, controls a selection of the common electrode voltage, and
when a third period elapses, controls output of the gate voltage, the data voltage, and the
backlight driving voltage and controls a selection of the common electrode voltage.

11. The liquid crystal display device of claim 10, wherein the timing controller
controls an alternative selection of a high voltage and a low voltage when the selection of the
bias voltage is controlled.
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12. The liquid crystal display device of claim 8, wherein the switching unit comprises
a first switching unit for ON/OFF switching the backlight driving voltage according to
the switching signal; and
20 a second switching unit for ON/OFF switching the bias voltage and the common
electrode voltage according to the switching signal.

13. The liquid crystal display device of claim 12, wherein the timing controller,
controls output of the gate voltage, the data voltage, the bias voltage, and the common
electrode voltage at initial operation,
25 when a first period elapses, controls the data voltage to be outputted with a level

equivalent to the level of the common electrode voltage,

when a second period elapses, controls the common electrode voltage to be replaced with the bias voltage,

when a third period elapses, controls the bias voltage to be replaced with the common electrode voltage, and

when a fourth period elapses, controls output of the backlight driving voltage.

14. The liquid crystal display device of claim 13, wherein the timing controller repeats several times the switching between the bias voltage and the common electrode voltage.

15. A driving apparatus of a liquid crystal display device including a gate driver for outputting scan signals sequentially; a source driver for outputting picture signals; an LCD panel including a plurality of gate line for transmitting the scan signals, a plurality of data line intersecting the plurality of gate lines for transmitting the picture signals, a plurality of switching element formed in regions surrounded by the plurality of gate line and data line and connected to the plurality of gate line and source line, respectively, and a plurality of picture electrode connected to the plurality of switching element for responding operation of the plurality of switching element, arranged in a matrix type; and a backlight positioned at a back side of the LCD panel, comprising:

a control unit for receiving a RGB picture signal and a first timing signal from the external and outputting the RGB picture signal, a second timing signal for displaying the RGB picture signal on a screen, a backlight control signal, and a bias signal; and

a first direct current power conversion unit responsive to an ON state of the backlight control signal for applying a backlight driving voltage to the backlight.

16. The driving apparatus of claim 15, wherein the control unit comprises

a timing controller for outputting a first switching signal the backlight control signal of OFF state at initial operation and outputting a second switching signal and the backlight control

signal of ON state after a predetermined period elapses;

a second direct current power conversion unit for outputting a predetermined bias voltage; and

a switching unit for outputting the bias voltage as the bias signal when the first switching signal is applied by the timing controller and the common electrode voltage as bias signal when the second switching signal is applied by the timing controller.

17. The driving apparatus of claim 16, wherein the timing controller applies the backlight control signal of OFF state to the second direct current power conversion unit at initial operation, and applies backlight control signal of ON state to the first direct current power conversion unit at the point that transition into bend state of liquid crystal arranged in the LCD panel is completed when a predetermined period elapses.

18. The driving apparatus of claim 16, wherein the bias voltage is a voltage of less level than the common electrode voltage.

19. The driving apparatus of claim 17, wherein the bias voltage is one of -10 volt and -20 volt.

20. The driving apparatus of claim 16, wherein the timing controller outputs an alternatively selected one of the first switching signal and the second switching signal when the backlight control signal of OFF state is applied.

21. The driving apparatus of claim 15, wherein the control unit comprises a switching unit for performing a first switching of at least one of a gate voltage for the scan signal, a data voltage for the picture signal, and a driving voltage for the backlight and performing a second switching of at least one of a bias voltage and a common electrode voltage; and

a timing controller for outputting a first switching signal to control the first switching to

the switching unit and outputting a second switching signal to control the second switching to the switching unit so that fast transition into bend state of the liquid crystal arranged in the LCD panel is accomplished.

22. The driving apparatus of claim 15 further comprises a second direct current power conversion unit for outputting the bias voltage to the switching unit.

23. The driving apparatus of claim 22, wherein the switching unit comprises a first switching unit for ON/OFF switching the gate voltage, the data voltage, and the backlight driving voltage according to the first switching signal; and

a second switching unit for ON/OFF switching the bias voltage and the common electrode voltage according to the second switching signal.

24. The driving apparatus of claim 23, wherein the timing controller, controls output of the gate voltage, the data voltage, the bias voltage, and the common electrode voltage at initial operation,

when a first period elapses, interrupts output of the gate voltage, the data voltage, and the common electrode voltage and controls a selection of the bias voltage,

when a second period elapses, controls a selection of the common electrode voltage, and

when a third period elapses, controls output of the gate voltage, the data voltage, and the backlight driving voltage and controls a selection of the common electrode voltage.

25. The driving apparatus of claim 24, wherein the timing controller controls an alternative selection of a high voltage and a low voltage when the selection of the bias voltage is controlled.

26. The driving apparatus of claim 22, wherein the switching unit comprises a first switching unit for ON/OFF switching the backlight driving voltage according to the switching signal; and

a second switching unit for ON/OFF switching the bias voltage and the common electrode voltage according to the switching signal.

27. The liquid crystal display device of claim 26, wherein the timing controller, controls output of the gate voltage, the data voltage, the bias voltage, and the common electrode voltage at initial operation,

when a first period elapses, controls the data voltage to be outputted with a level equivalent to the level of the common electrode voltage,

when a second period elapses, controls the common electrode voltage to be replaced with the bias voltage,

when a third period elapses, controls the bias voltage to be replaced with the common electrode voltage, and

when a fourth period elapses, controls output of the backlight driving voltage.

28. The driving apparatus of claim 27, wherein the timing controller repeats several times the switching between the bias voltage and the common electrode voltage.

29. A driving method of a liquid crystal display device including a LCD module including a LCD panel, a gate driver, and a data driver; and a backlight positioned at a back side of the LCD panel, comprising:

(a) a step of inducing transition into bend state by a high voltage by applying a data voltage and a gate voltage not selected at initial operation of the liquid crystal display device to the LCD panel and applying an external bias voltage separately to the LCD panel;

(b) a step of interrupting the external bias voltage when a predetermined time elapses and applying a common electrode voltage to the LCD panel; and

(c) a step of applying a predetermined backlight driving voltage to the backlight at the same time of applying the common electrode voltage to the LCD panel.

30. The driving method of claim 29, wherein the step (a) further comprises a step of

selecting alternatively the external bias voltage and the common electrode voltage several times and applying a selected one of the external bias voltage and the common electrode voltage to the LCD panel.

31. The driving method of claim 29, wherein the point that the predetermined time elapses in the step (b) is the point that transition into bend state is completed.

32. The driving method of claim 29, wherein the step (a) includes applying the backlight driving voltage of OFF state to the backlight upon applying the external bias voltage separately to the LCD panel.

33. The driving method of claim 30, wherein the step (a) includes applying the backlight driving voltage of OFF state to the backlight.

34. A driving method of a liquid crystal display device including a LCD module including a LCD panel, a gate driver, and a data driver; and a backlight positioned at a back side of the LCD panel, comprising:

(a) a step of controlling a gate voltage and a data voltage to be applied to the LCD panel at initial operation of the liquid crystal display device and controlling output of an external bias voltage and a common electrode voltage;

(b) a step of preventing the gate voltage, the data voltage, and the common electrode voltage from being applied to the LCD panel, and selecting the external bias voltage to be applied to the LCD panel;

(c) a step of applying the common electrode voltage replacing the external bias voltage to the LCD panel;

(d) a step of , when a predetermined period elapses, interrupting the application of the external bias voltage, applying the gate voltage and the data voltage to the LCD panel, and applying the common electrode voltage to a common electrode line of the LCD panel; and

(e) a step of applying a predetermined backlight driving voltage to the backlight at the

same time of applying the common electrode voltage to the common electrode line.

35. The driving method of claim 34, wherein the step (b) includes applying alternatively a high voltage and a low voltage when the external bias voltage is applied.

36. A driving method of a liquid crystal display device including a LCD module
5 including a LCD panel, a gate driver, and a data driver; and a backlight positioned at a back side of the LCD panel, comprising:

(a) a step of controlling a gate voltage and a data voltage to be applied to the LCD panel at initial operation of the liquid crystal display device and controlling output of an external bias voltage and a common electrode voltage;

(b) a step of controlling the external bias voltage and the common electrode voltage to be alternatively applied to the LCD panel several times;

(c) a step of applying the common electrode voltage replacing the external bias voltage to the LCD panel;

(d) a step of maintaining output of the common electrode voltage and controlling output
15 of the backlight driving voltage;

(e) a step of , when a predetermined period elapses, interrupting the application of the external bias voltage, applying the gate voltage and the data voltage to the LCD panel, and applying the common electrode voltage to a common electrode line of the LCD panel; and

(f) a step of applying a predetermined backlight driving voltage to the backlight at the
20 same time of applying the common electrode voltage to the common electrode line.

37. The driving method of claim 36, wherein the step (b) includes controlling the data voltage to be applied with a level equivalent to the level of the common electrode.

38. The driving method of claim 36, wherein the data voltage is an alternate voltage.